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(54) Title: A SMALL HARDWARE IMPLEMENTATION OF THE SUBBYTE FUNCTION OF RIJNDAEL

in <sub>0</sub>	in <sub>4</sub>	in <sub>8</sub>	in <sub>12</sub>	S <sub>0,0</sub>	S <sub>0,1</sub>	S <sub>0,2</sub>	S <sub>0,3</sub>		out <sub>0</sub>	out <sub>4</sub>	out <sub>8</sub>	out <sub>12</sub>
in <sub>1</sub>	in <sub>5</sub>	ing	in <sub>13</sub>	S <sub>1,0</sub>	S <sub>1,1</sub>	S <sub>1,2</sub>	S <sub>1,3</sub>		out <sub>1</sub>	out <sub>5</sub>	outg	out <sub>13</sub>
in <sub>2</sub>	in <sub>6</sub>	<sup>in</sup> 10	in <sub>14</sub>	S <sub>2,0</sub>	S <sub>2,1</sub>	S <sub>2,2</sub>	S <sub>2,3</sub>	<b>-</b>	out <sub>2</sub>	out <sub>6</sub>	out <sub>10</sub>	out <sub>14</sub>
in <sub>3</sub>	in <sub>7</sub>	in <sub>11</sub>	in <sub>15</sub>	S <sub>3,0</sub>	S <sub>3,1</sub>	S <sub>3,2</sub>	S <sub>3,3</sub>		out <sub>3</sub>	out <sub>7</sub>	out <sub>11</sub>	out <sub>15</sub>

(57) Abstract: A small hardware implementation is provided for the Advanced Encryption Standard SubByte function that implements the affine transform and inverse transform in a single Affine-All transform using a multiplicative inverse ROM. The logic is greatly reduced and the maximum path delay is reduced compared to a multiplexor implementation and is slightly greater than a ROM implementation.